Spending to Save: Evaluation of the Energy Efficiency Obligation in Denmark

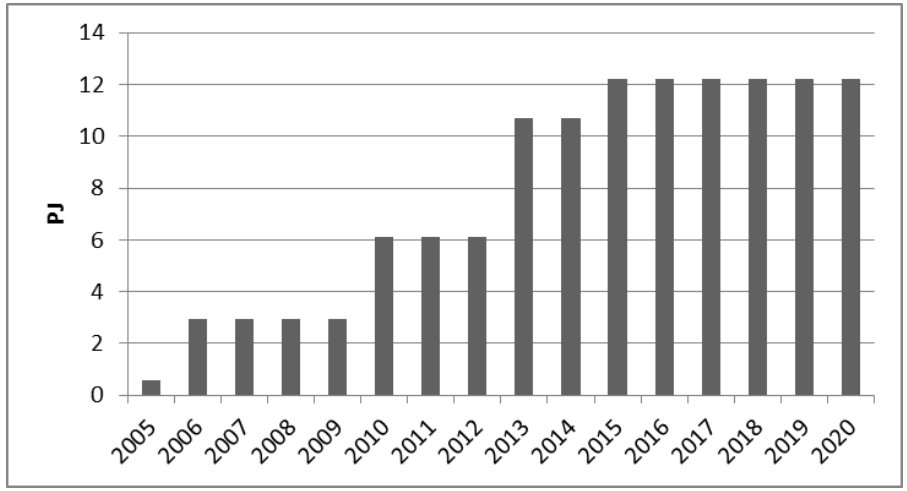
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eceee 2013 Summer Study

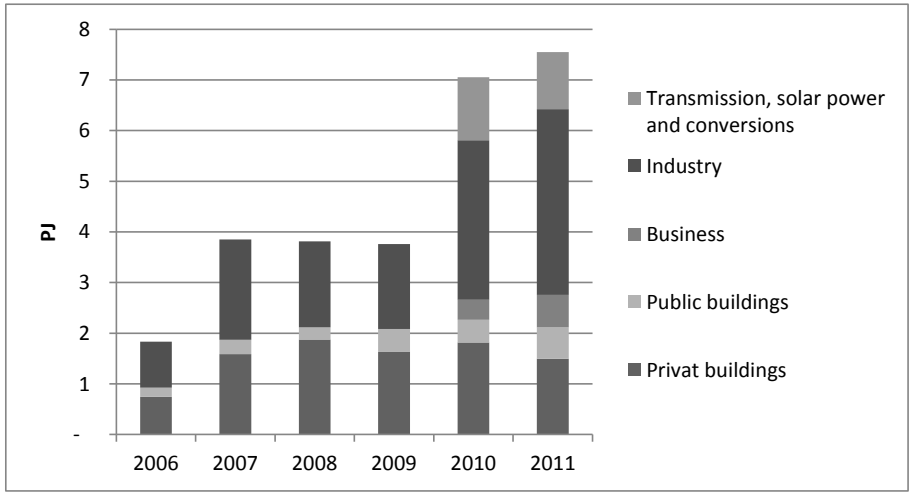
3rd of June 2013

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Target and reported savings



Development in the Danish EEO target.
(Target in first year savings)



Reported savings in the Danish EEO 2006-2011 distributed on sectors.
(123% of the target in 2011)

… but what does the EEO actually deliver?

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Net impact

Reported savings

- Technical accuracy of calculations
- Additionality
- Rebound
- Spill-over

1) Assessment of the technical accuracy of the calculation of the savings based on review of documentation
2) Analysis of additionality based on interviews with end-users

Statistical analysis of measured consumption

- Recorded energy before and after
- Action group and control group
- Detailed information about both groups

3) Statistical case study of heat savings in single family houses with district heating

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Technical accuracy

- Review of calculation methods and assessment of assumptions and conditions under which the calculations have been made
- 121 reported energy saving projects from 25 obligated parties reported in 2011
- Focus on the largest projects, 20% of the total reported savings for 2011

Technical accuracy results

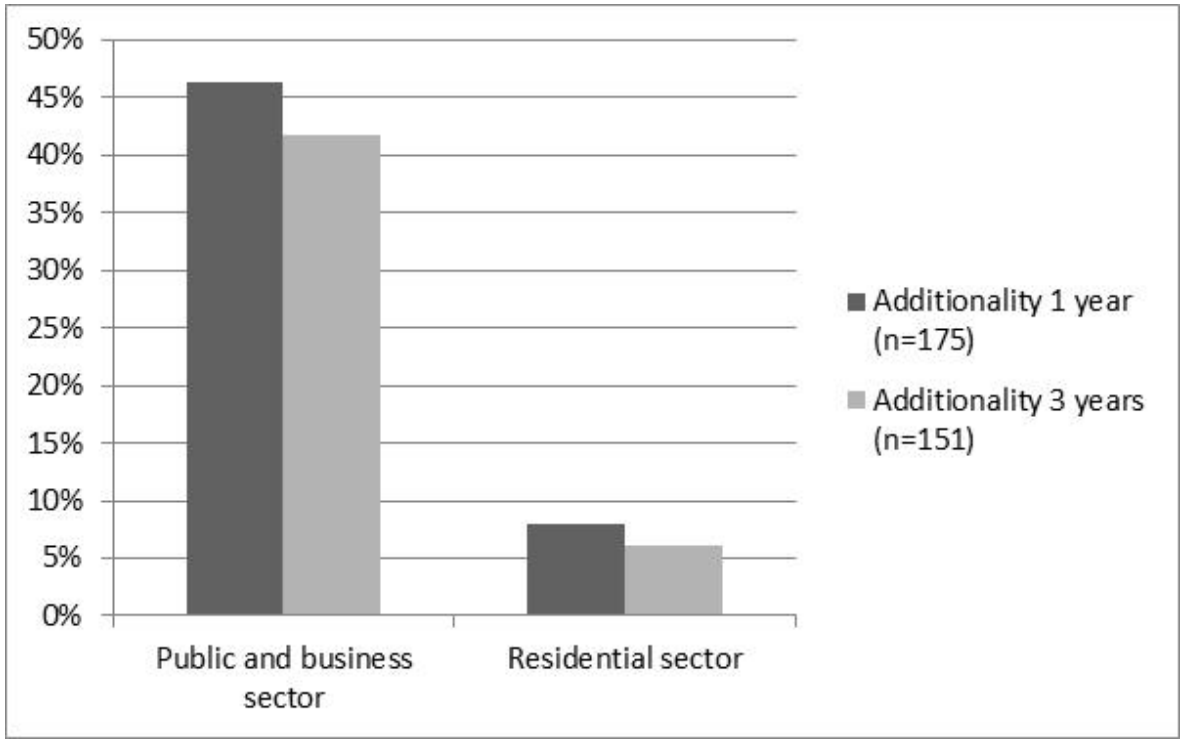
- Average 6% overestimation in the review.
- Mostly larger projects with specific calculation

- Calculation errors
  - Incorrect use of conversion factors, mistakes in quantifying the area of relevance to the energy saving measure etc.
  - Not taking the total energy balance into account when calculating the energy saving potential, e.g. ignoring extra energy consumption elsewhere in an industrial process.
- Improper/incorrect use of assumptions
  - Often open for interpretation
  - In some cases, the reference case is too lax resulting in estimates of too high energy savings.

Additionality analysis

- 209 telephone interviews with end-users involved in the EEO (all energy forms and all end-use sectors).
- 30% of the projects represented in the evaluation (16% of the total obligation).
- 4 hypothetical questions in the interviews addressed the additionality:
  - To what extent were you, before you came in contact with [the energy distribution company], thinking about realising the energy saving project?
  - How likely is it that you, without contact to [the energy distribution company] or [other actors], had implemented the energy saving project within 1 year? / 3 years?
  - How critical to the implementation of the project was the subsidy that you received?
- The quantitative answers were converted to an additionality factor.

Additionality results



Average additionality for the public and business sector and the residential sector based on interviews with end-users (public and business sector n=129, residential sector n=46).

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Additionality – methodological challenges

- Based on hypothetical questions
  - Strategic answers etc.
- Sample size
  - Residential sector n=46, non-residential sector n=129
- Response rate
  - Residential sector: 24%, non-residential sector 49%
- Lapse lapse between implementation and interview
  - Maximum 2 years

Net impact results

- The net impact is expectedly lower than the reported savings
  - Technical accuracy: 6% overestimation in the review of 121 concrete (mostly larger) projects.
  - Additionality: 20% for residential sector, 45% for public and business sector
  - Net savings: It is estimated that compared with "today's standard" leads to an overestimation of savings.
- Average net impact = 36%! 7.54 PJ => 2.74 PJ

- Statistical case study
  - Analysis of 166 district heating savings projects suggests that the effect on actual energy consumption is only 44% of the registered energy.

Dilemma:
Accuracy versus simplicity

- Do we need to measure the realised savings or the effect of the instrument?
- Higher <-> lower administrative and evaluation costs
  - Measured savings <-> reported savings
  - Measured additionality <-> stated additionality
- Added value of having precise measures of the savings?
- Experience with or reccommendations for ”simple” methods?

The silver lining – Savings in industry

- Accounts for 49% of savings in 2011
- High additionality, high cost-effectiveness
- Considered attractive to the obligated parties – few administration costs
- Considered attractive by the industry – subsidies reduce the payback time/risk coverage and/or finance advice of professional consultants
- However, projects with very attractive business case, with payback times as short as 1-2 years – restriction and documentation
- Address loopholes identified in evaluations